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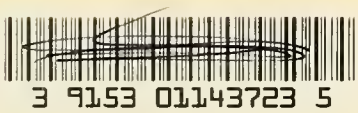

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Cauliflower and Broccoli Trials—1988

BY DAVID E. HILL

Bulletin 869

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SUMMARY

During 1988, cultivar trials of broccoli and cauliflower were conducted during the spring and fall at Mt. Carmel (coastal, upland loamy soil) and Windsor (inland, sandy terrace soil). In spring, average yield of 12 cultivars of cauliflower harvested at Windsor and Mt. Carmel was 12,584 lb/A in the first crop and 11,084 lb/A in the second crop. Yields of White Fox, Andes, and White Rock exceeded 16,000 lb/A at both sites and had excellent quality. In fall, the average yield of 17 cultivars of cauliflower, planted in two crops, was 12,800 lb/A at Windsor and 9,346 lb/A at Mt. Carmel. Yields of White Sails, Candid Charm and Snow King exceeded 10,800 lb/A in each crop at both sites. In spring, average yield of 10 broccoli cultivars was 9,656 lb/A at Windsor and 7,643 lb/A at Mt. Carmel. Yield of Green Belt exceeded 8,000 lb/A at both sites. The quality of Cruiser, Green Comet, Packman, Premium Crop and Symphony was excellent but yields at Mt. Carmel were below 8,000 lb/A. In fall, the average yield of 11 cultivars of broccoli was 14,186 lb/A at Windsor and 9,688 lb/A at Mt. Carmel. The yield of Emperor, Green Comet, Green Valiant and Symphony exceeded 8,000 lb/A in each of 2 crops at both sites and quality was excellent. The lower average yield of fall grown cauliflower and broccoli at Mt. Carmel, compared to Windsor, was due to a persistent infection of downy mildew which stunted the plants.

A 4-year summary of broccoli trials and 3-year summary of cauliflower trials identifies cultivars with consistent high yields and quality.

Cauliflower and Broccoli Trials—1988

BY DAVID E. HILL

In 1985 the "Broccoli Project" was established by the Connecticut Department of Agriculture to enlist growers of broccoli to supply two supermarket chains who agreed to sell Connecticut-grown produce. The project expanded each year from 8 acres in 1985 to over 20 growers with 100 acres planted in 1988. The Connecticut Agricultural Experiment Station's role in the Project was testing cultivars (cultural varieties) to determine those best suited to Connecticut's soil and climate. In 4 years I have tested 48 cultivars from domestic and European seed companies and seven experimental cultivars (Hill 1986, 1987, 1988).

Retesting of cultivars is important because annual temperatures and rainfall vary and some cultivars may vary in quality. Accordingly, those cultivars meeting national quality standards for commercial growers (Anon. 1943) were evaluated repeatedly. Also, I began serial planting in 1986 to determine the duration of harvest in spring and fall and maintenance of quality of preferred cultivars throughout the harvest period.

In response to grower interest in cauliflower, I have evaluated 41 cultivars since 1986, including four experimentals; in 1987, I began serial planting to determine duration of harvest.

In this bulletin, I report yields and maturity of 12 broccoli cultivars and 17 cauliflower cultivars grown at Windsor and Mt. Carmel in the spring and fall of 1988. Additionally, I summarize broccoli trials during 1985-88 and cauliflower trials during 1986-88 to focus on cultivars suitable for commercial growers and home gardeners.

SITES AND MANAGEMENT

The cauliflower and broccoli trials were conducted at the Valley Laboratory, Windsor on Merrimac sandy loam, a sandy terrace soil with somewhat limited moisture holding capacity; and at Lockwood Farm, Mt. Carmel on Cheshire fine sandy loam, a loamy upland soil with a moderate moisture holding capacity (spring crop), and Watchaug loam, a moderately well drained, loamy upland soil with moderate moisture holding capacity (fall crop).

Seeds for the first and second spring plantings were sown 2 weeks apart in a greenhouse maintained at 50-70F. Four-week-old seedlings were moved to a cold frame for hardening 1 week before they were transplanted in the field. The seedlings were transplanted in rows 36 in. apart with spacing 18 in. within the rows to provide 9680 plants/A. Each planting consisted of five randomized blocks with six plants per cultivar in each replication. Transplanted seedlings that died the first week were replaced.

The soil in both the spring and fall crops of cauliflower was sprayed with 5 lb/A boron dissolved in water 1 month following transplanting to prevent hollow stem and browning of curds, commonly observed in the 1986 cauliflower trials.

Seeds for the three fall crops were sown at 2-week intervals in a greenhouse and moved outside 1 week after germination. Four-week-old seedlings were transplanted in the field when they were in the 4-leaf stage and about 4 in. high.

The seedlings were grown in Promix BX in standard plastic pots measuring 2 5/8 x 2 1/4 x 2 5/16 in. and held in packs of 36. Water soluble 20-20-20 fertilizer (1 tbsp/gal.) was added to the seedlings 1 week before transplanting.

In spring, leaves of cauliflower were tied around the newly developing curds when they reached about 2 in. diameter. In fall, all plants producing 2-in. curds before October 1 were tied. After October 1, leaves of "self-blanching" cultivars were not tied because the inner leaves remained tightly furled about the curd.

Mature heads of broccoli and cauliflower were harvested at 3-day intervals. Yields of broccoli were weighed and the quality was judged for color, evenness and compactness of head, excessive stalkiness, and leaves protruding from the head. The quality of cauliflower was judged for size, color, smoothness of curd, and protection of the curd by surrounding leaves of self-blanching types.

The selection of cultivars for each of the spring and fall plantings was based on prior trials (Hill 1986, 1987). The first spring planting contained only those cultivars of broccoli and cauliflower that had medium and late maturities. Early maturing broccoli cultivars Galaxy, Packman and Southern Comet and the cauliflower cultivar Snow King were not planted in the first crop because of their tendency to "button" in response to cool spring temperatures. Late maturing cauliflower cultivars Snowman, White Rock and White Top were not planted in the second spring planting because they would mature with doubtful quality during the heat of July. New broccoli cultivars Saga and Early Dawn and new cauliflower cultivars Avalanche and Montano were planted in both crops to evaluate their yield and quality throughout the spring harvest. Late-maturing Snow Pak and PSR100184 were added because they produced high quality curds in 1987 (Hill, 1988).

In the fall, all broccoli cultivars used in the spring were repeated in the first and second crops. Premium Crop, which had demonstrated high susceptibility to downy mildew and bacterial soft rot, was excluded in the fall. In the third fall crop, broccoli cultivars Emperor, Green Belt, Green Valiant, and Symphony were retested because they demonstrated suitability for late-fall harvests in earlier trials (Hill 1987). Early-maturing Early Dawn was added to test its suitability for late-fall harvests. All cauliflower cultivars used in spring were retested in the first fall crop. Late-maturing cultivars were not used in the second fall planting because they would not mature before a killing frost. Early-maturing cauliflower Snow King was included in the third planting to determine if it was suitable for planting in mid-August. Details of management of soil and crops and pertinent dates are listed in Table 1.

YIELD AND QUALITY OF CAULIFLOWER

Spring crop.

The average yield of all cauliflower cultivars in the first spring planting at Windsor was 12,833 lb/A compared to 12,335 lb/A at Mt. Carmel, a difference of 4% (Table 2). In the second crop, planted 2 weeks later, average yields

Table 1. Soil and crop management of cauliflower (C) and broccoli (B) and pertinent dates, 1988.

Activity		Spring crop	Fall Crop
Soil fertilization (Rates based on soil tests)			
10-10-10	B,C	1000 lb/A	1000 lb/A
Ammonium nitrate	B,C	150 lb/A (B)	150 lb/A (B)
(Sidedress 1 month after transplanting)		90 lb/A (C)	90 lb/A (C)
Lime (to attain pH 6.5)	B,C	None	None
Soluble Boron	C	5 lb/A	5 lb/A
(Applied to soil 1 month after transplanting)			
Planting Dates			
Seeding in greenhouse	1st Crop B,C	March 14-15	June 15-16
or outdoor enclosure	2nd Crop B,C	March 30-31	July 2
	3rd Crop B,C		July 16
Transfer to cold frame	1st Crop B,C	April 13	
	2nd Crop B,C	April 28	
Transplant seedlings to field	1st Crop B,C	April 20-21	July 13-16
	2nd Crop B,C	May 4-6	July 29-August 2
	3rd Crop B,C		August 16-17
Pest Control			
Root maggots	B,C	Lorsban 4E	Lorsban 4E*
Cabbage worms**	B,C	-	Pydrin 2.4E
Flea beetles**	B,C	-	Sevin, Pydrin 2.4E
Number of Irrigations			
Windsor	B,C	2	5
Mt. Carmel	B,C	2	4

* Treated only first fall crop. ** As needed.

of all cultivars at Windsor were 11,965 lb/A compared to 10,204 lb/A at Mt. Carmel, a difference of 17%. The higher average yield of later crops at Windsor is consistent with 1986 and 1987 trials. Comparing only those cultivars common to the first and second crops, yields were reduced 6% in the second crop at Mt. Carmel. At Windsor, yields of first and second crops were similar.

In the first crop at Windsor, White Fox and Andes had the greatest yields with 17,162-18,267 lb/A; at Mt. Carmel, yields of Andes and White Rock excelled with 16,053-18,271 lb/A. At both sites yields of Candid Charm, Taipan, White Sails and White Top exceeded the national average of 10,800 lb/A (Anon. 1985). Among these seven cultivars all, except Candid Charm, had consistently good quality with firm medium-size curds averaging nearly 1.7 lb. Curds of Candid Charm were lumpy with irregular growth of individual branches within the curd. Although the quality of curds of Cloud Nine, Polar Express and White Knight in 1988 was similar to 1987, yields were below the national average, except White Knight at Windsor, because of 17-30% seedling mortality.

In the second crop, White Fox yielded 17,120-18,354 lb/A and curds had excellent quality. The firm, ball-shaped curds consistently weighed 1.8-2.0 lb. The yields of White Summer and Avalanche exceeded the national average and were also of excellent quality. The yields of the remaining cultivars were inconsistent between sites even though quality of most cultivars was good. Montano and late-maturing curds of White Knight and White Sails displayed ricing or premature development of flower parts. Snow King, an early cultivar, formed very small curds.

Table 2. Yield of cauliflower at Windsor and Mt. Carmel, Spring 1988.

	Windsor			Mt. Carmel		
Cultivar	Curds Hvst. %	Avg. Curd lb	Total Yield lb/A	Curds Hvst. %	Avg. Curd lb	Total Yield lb/A
Andes *	100	1.8	17162	100	1.7	16053
Avalanche	77	1.2	9256	87	1.4	11458
Candid Charm	93	1.5	13725	93	1.6	14046
Cloud Nine	70	1.2	7865	73	1.1	7849
Montano	93	1.4	12981	77	1.2	9155
Polar Express	93	1.6	14307	83	1.2	9943
Snowman	40	1.3	5062	50	1.3	6252
Taipan *	90	1.7	15065	93	1.7	15171
White Fox *	100	1.9	18267	97	1.6	14571
White Knight	73	1.4	9676	73	1.2	8793
White Rock *	97	1.7	15562	100	1.9	18271
White Sails *	90	1.6	14137	97	1.6	15380
White Top	87	1.6	13766	90	1.5	13411
Second Crop						
Avalanche *	97	1.6	14793	93	1.5	13343
Candid Charm	73	1.5	10580	83	1.5	12232
Cloud Nine	87	1.4	11944	77	1.1	8264
Montano	93	1.3	11514	73	1.1	7709
Polar Express	97	1.3	12263	77	1.1	8466
Snow King	97	0.3	2711	90	0.4	3711
White Fox *	97	2.0	18354	97	1.8	17120
White Knight	97	1.3	12445	80	1.0	7764
White Sails	70	1.4	9357	80	1.5	11313
White Summer *	100	1.6	15690	100	1.3	12120

* Cultivars produced high quality heads at both Windsor and Mt. Carmel.

Fall crop.

The average yield of all cauliflower cultivars in the first fall planting was 12,875 lb/A at Windsor and 9,369 lb/A at Mt. Carmel, a difference of 37% (Table 3). The average yields in the second crop, planted 2 weeks later, was 12,848 lb/A at Windsor compared to 9,322 lb/A at Mt. Carmel, a difference of 38%. The average yield of both crops at both sites is remarkably constant. These yields were attained in the face of a persistent infection of downy mildew which appeared in the heat of early August following long periods of clouds and rain in July. The presence of downy mildew throughout August and September caused leaves to drop prematurely and small curds to form. The effects of the state-wide infection in 1988 can be seen by comparing these yields with those in 1987 when no disease was present. In 1987, average yield of all cultivars was 15,308 lb/A at Windsor and 14,252 lb/A at Mt. Carmel, an increase of 16% and 34% at each

Table 3. Yield of cauliflower at Windsor and Mt. Carmel, Fall 1988

	Windsor			Mt. Carmel		
Cultivar	Curds Hvst. %	Avg. Curd lb	Total Yield lb/A	Curds Hvst. %	Avg. Curd lb	Total Yield lb/A
Andes	100	1.9	18674	100	1.1	10687
Avalanche	83	1.2	9480	90	0.9	7457
Candid Charm *	90	2.0	17283	93	1.5	13341
Cloud Nine	90	1.4	12463	50	0.8	3630
Montano	70	1.8	12060	87	1.3	10830
Polar Express *	83	1.7	13980	93	1.3	11919
PSR100184	97	1.1	10523	97	0.8	7934
Snow King *	97	1.3	12000	100	1.3	12642
Snowman	80	1.0	7562	90	0.8	6638
Snow Pak	97	1.0	9551	80	0.9	6737
Taipan	87	1.6	13098	97	0.9	8864
White Fox	73	1.7	12045	93	1.0	9119
White Knight *	80	1.7	13209	87	1.3	10847
White Rock	97	1.3	12627	100	1.0	9922
White Sails *	87	2.1	18078	87	1.4	11742
White Summer	97	1.5	14307	100	0.8	7966
White Top	97	1.3	11938	97	1.0	9005
Second Crop						
Andes	97	1.4	13538	100	0.8	7905
Candid Charm *	97	1.5	14307	90	1.3	11172
Cloud Nine	83	1.5	11911	80	0.7	5505
Polar Express	83	1.6	14440	97	1.3	12283
Snow King	90	1.6	13955	93	1.4	12257
Taipan	87	1.0	8644	97	0.8	7670
White Fox	83	1.2	9501	100	0.7	7220
White Knight	93	1.4	12941	80	1.0	7441
White Sails *	100	1.7	16396	100	1.3	12443
Third Crop						
Snow King *	100	0.9	8772	93	0.9	7857

* Cultivars produced high quality heads at both Windsor and Mt. Carmel.

site compared to 1988. The plants at Mt. Carmel were more seriously infected than those at Windsor.

The yield of a third crop of early-maturing Snow King was 8,772 lb/A at Windsor and 7,857 lb/A at Mt. Carmel, a difference of 10%. Although the yield was below the national average at both sites, quality was good and free of disease.

Despite the ravages of downy mildew in the first and second fall crops of cauliflower, several cultivars yielded well. In the first crop at Windsor, the yields of White Sails and Andes were greatest at 18,078-18,674 lb/A. The quality of White Sails was consistently excellent, but curds of Andes were irregularly shaped and some contained small leaves protruding from the curds. In the first crop at Mt. Carmel, the yields of Snow King and Candid Charm were greatest with 12,642-13,341 lb/A. Their quality was consistently excellent. The yields of Polar Express and White Knight were above the national average at both sites and quality was excellent. Some curds of late-maturing Avalanche, PSR100184, Snow Pak, Taipan, White Fox, and White Summer were damaged by frost at Mt. Carmel in late-October.

In the second crop, the yield of White Sails again was greatest with 12,443 lb/A at Mt. Carmel and 16,394 lb/A at Windsor. The smooth white curds were of excellent quality. The yields of Candid Charm, Polar Express, and Snow King exceeded the national average of 10,800 lb/A. Quality of the curds was excellent even though the plant leaves were infected with downy mildew. Frost damaged some curds of Taipan and White Fox whose wrapper leaves did not fully envelop the curd.

In the third crop the self-blanched curds of Snow King weighed 0.9 lb and the plants were free of disease. Although the yields of Snow King at Windsor and Mt. Carmel were below the national average, their uniform quality and early maturity suggests that they can be planted up to August 15 in the Connecticut Valley.

Maturity

Maturity of cauliflower is important in scheduling planting for a specific harvest period. The days to maturity were calculated from the day of transplanting to the day when half of the curds were harvested; i. e. the harvest date of the 15th curd from a population of 30 plants (Table 4). Among the 15 cultivars planted in spring, maturity seldom varied more than 4 days between sites. Maturity in the first crop was slowed about 16 days at both sites by several frosts in late April following transplanting in the field in 1988. Delayed maturity of the first crop resulted in a simultaneous harvest with the second crop and nullified the intended broadening of the harvest period by planting a second crop. In 1987, the simultaneous maturity of both spring crops was not observed (Hill 1988).

In fall, maturity of 15 cultivars common to spring and fall was longer than in spring. The range in harvest midpoint was 57 to 124 days at Mt. Carmel and 47 to 106 days at Windsor. Cultivars with maturities exceeding 100 days planted for a fall crop in upland areas have high probabilities of frost damage. The increased maturity in the fall crop compared to spring is the result of decreasing temperatures and shorter days and is consistent with 1986 and 1987 trials (Hill 1987, 1988). Comparing only those cultivars common to the first and second fall crops, the average maturity in the second fall crop at Mt. Carmel (85 days) was less than in the first crop (90 days). At Windsor maturities were identical for both crops (82 days). The delay in maturity at Mt. Carmel, especially in the first crop, resulted from downy mildew which damaged the oliage and caused leaves to shed prematurely. The disease profoundly affected the average harvest midpoint of late-maturing Avalanche, PSR100184, Snowman, SnowPak, White Rock, and White Top at Mt. Carmel (115 days) compared to Windsor (105 days). The maturity of early Snow King was variable among the three crops at both sites. Despite variability, its short harvest midpoint (54 days) suggests to me that plantings to August 15 in the Connecticut Valley are less risky than other cultivars with longer maturities.

Another facet of maturity is the span of harvest, which I define as the days between the harvest of the first and last marketable curd. In spring, the harvest span of virtually all cultivars exceeded 10 days at both sites. The harvest spans of Avalanche and Montano exceeded 21 days at both sites. The harvest span of all cultivars shortened to less than 14 days in the second crop. Snow King, with the shortest harvest midpoint, had the shortest harvest span, 3 to 7 days.

In fall, the harvest span increased for all cultivars compared to spring plantings. In the first fall crop, the average harvest span of all cultivars was 23 days at Mt. Carmel and 19 days at Windsor. In the second fall crop, the average harvest span decreased to 18 days at Mt. Carmel and to 16 days at Windsor. The longer harvest span at Mt. Carmel was due to downy mildew disease. Those cultivars with harvest spans of 3 weeks or more are useful to growers who produce cauliflower for roadside markets and rely on multiple harvests to provide freshly picked curds.

YIELD AND QUALITY OF BROCCOLI

Spring crop.

The average yield of all cultivars planted in the first crop was 6,570 lb/A at Windsor and 5,030 lb/A at Mt. Carmel, a difference of 31% (Table 5). At Windsor, Cruiser and Premium Crop yielded 8,681-9,248 lb/A, just over the national average of 8,000 lb/A. At Mt. Carmel,

Table 4. Maturity of cauliflower at Windsor and Mt. Carmel, Spring and Fall 1988.

	Windsor				Mt. Carmel			
	Harvest Midpoint		Harvest Span		Harvest Midpoint		Harvest Span	
Cultivar	Spring Days*	Fall Days*	Spring Days**	Fall Days**	Spring Days*	Fall Days*	Spring Days**	Fall Days**
Andes	68	85	21	28	68	99	14	43
Avalanche	78	106	21	7	75	115	21	19
Candid Charm	71	85	14	35	71	88	18	34
Cloud Nine	82	89	18	31	82	95	14	18
Montano	64	85	24	7	68	88	21	14
Polar Express	64	82	10	14	64	85	10	18
PSR100184	-	106	-	13	-	106	-	22
Snow King	-	47	-	18	-	57	-	24
Snowman	85	106	21	20	82	124	18	19
Snow Pak	-	106	-	20	-	124	-	19
Taipan	71	92	14	14	75	106	21	30
White Fox	71	89	10	17	75	106	21	23
White Knight	68	85	11	24	64	85	7	18
White Rock	82	99	10	21	82	106	10	25
White Sails	71	82	14	18	71	88	11	21
White Summer	-	99	-	17	-	106	-	20
White Top	78	106	17	23	75	115	18	22
Second Crop								
Andes	-	89	-	20	-	90	-	25
Avalanche	63	-	11	-	60	-	11	-
Candid Charm	60	82	11	20	63	86	7	14
Cloud Nine	60	82	14	23	63	90	14	29
Montano	49	-	10	-	53	-	10	-
Polar Express	53	79	11	14	53	83	7	11
Snow King	46	61	7	1	39	51	3	7
Taipan	-	95	-	6	-	99	-	18
White Fox	63	95	14	13	63	99	7	22
White Knight	49	79	11	21	55	86	10	20
White Sails	60	82	7	23	60	86	11	20
White Summer	63	-	7	-	63	-	10	-
Third Crop								
Snow King	-	51	-	14	-	58	-	17

* Time from transplanting to midpoint of harvest.
** Time from start to finish of harvest.

Premium Crop and Cruiser (7,103-7,710 lb/A) were near the national average but other cultivars fell far short. The heads of Cruiser and Premium Crop weighed 0.8-1.0 lb and were of consistent quality. The quality of Green Comet was also excellent but yields were not consistent at both sites. The heads of Saga and Symphony were small but suitable for bunching. Heads of Early Dawn formed prematurely on small plants, a process called buttoning.

In the second planting, the average yield of all cultivars was 9,656 lb/A at Windsor and 7,643 lb/A at Mt. Carmel, a difference of 26%. The yield of Green Belt was greatest at both sites with 14,207 lb/A at Windsor and 11,556 lb/A at Mt. Carmel. The tight, dome-shaped, and well-exerted heads weighed 1.3-1.6 lb. At Windsor, the yield of all cultivars except Early Dawn exceeded the national average; at Mt. Carmel, 5 of 10 cultivars had satisfactory yields. The quality of Cruiser, Green Comet, Packman, Premium Crop, and Symphony was excellent at both sites but yields of Cruiser, Green Comet and Symphony at Mt. Carmel were below the national average.

Although the yields of Saga and Southern Comet exceeded the national average, the heads were lumpy with leaves protruding the head.

Comparing only those cultivars common to both spring plantings, yields in the second crop were 47 to 50% greater than in the first crop. Frosts in late-April, after transplanting, retarded the growth of the first crop causing smaller heads to form.

Fall crop.

The average yield of all cultivars in the first fall crop was 14,186 lb/A at Windsor and 9,688 lb/A at Mt. Carmel, a difference of 46% (Table 6) and all cultivars at both sites exceeded the national average. A very wet July followed by temperatures above 90F to mid-August caused rank growth in both sites and bacterial soft rot formed in many heads of Cruiser, Galaxy, Packman, and Southern Comet at Windsor. At Windsor, the yield of Emperor was greatest with 19,811 lb/A, twice the national average. The heads, weighing an average of 2.1 lb, were

Table 5. Yield of broccoli at Windsor and Mt. Carmel, Spring 1988

	Windsor			Mt. Carmel		
Cultivar	Heads Hvst. %	Avg. Curd lb	Total Yield lb/A	Heads Hvst. %	Avg. Curd lb	Total Yield lb/A
Cruiser *	97	0.9	8681	97	0.8	7103
Early Dawn	97	0.3	2772	97	0.2	2044
Green Comet *	100	0.8	7845	97	0.6	5909
Premium Crop *	97	1.0	9248	97	0.8	7710
Saga	97	0.5	4877	93	0.5	4079
Symphony	97	0.6	5990	80	0.4	3328
Second Crop						
Cruiser *	87	1.3	10891	73	0.9	6083
Early Dawn	77	0.7	5448	97	0.6	5464
Galaxy	93	0.6	5807	97	0.4	3440
Green Belt *	93	1.6	14207	90	1.3	11556
Green Comet *	100	1.1	10346	97	0.8	7771
Packman	97	0.9	8698	100	0.9	8450
Premium Crop	83	1.0	8155	93	0.9	8339
Saga	97	1.1	10361	100	0.9	8551
Southern Comet	90	1.3	11535	90	1.1	9458
Symphony *	97	1.2	11110	90	0.8	7321

* Cultivars produced high quality heads at both Windsor and Mt. Carmel.

tight and well-domed, a characteristic that discourages head rot. At Mt. Carmel, the yields of Galaxy, Packman and Symphony exceeded 11,000 lb/A but only Symphony had excellent quality. The yields of Green Comet and Green Valiant were also above the national average with excellent quality despite unfavorable weather.

In the second fall crop, the average yield of all cultivars was 8,669 lb/A at Windsor and 8,037 lb/A at Mt. Carmel, a difference of 8%. Although average yields of the second crop at Windsor fell 35% at Windsor and 18% at Mt. Carmel compared to the first crop, overall quality improved because maturity occurred during cooler September. At Windsor, Emperor, Green Belt, Green Comet and Packman had the greatest yields with over 9,000 lb/A. At Mt. Carmel, the yields of Cruiser, Green Valiant and Saga exceeded 8,000 lb/A. All of these cultivars had excellent quality at both sites. The quality of Symphony was excellent at both sites but yields were only

Table 6. Yield of broccoli at Windsor and Mt. Carmel, Fall 1988.

	Windsor			Mt. Carmel		
Cultivar	Heads Hvst. %	Avg. Head lb	Total Yield lb/A	Heads Hvst. %	Avg. Head lb	Total Yield lb/A
Cruiser	83	2.1	16591	100	1.0	9942
Early Dawn	100	1.1	10809	100	0.9	8551
Emperor *	97	2.1	19811	93	1.0	8777
Galaxy	100	1.5	14339	100	1.2	11818
Green Belt	97	1.3	12223	97	0.9	8178
Green Comet *	100	1.1	10708	97	1.0	9774
Green Valiant *	97	1.2	10806	97	0.9	8054
Packman	97	1.2	11737	97	1.2	11339
Saga	100	1.8	17343	97	0.9	8056
Southern Comet	90	2.1	18170	100	1.1	10487
Symphony *	100	1.4	13512	100	1.2	11596
Second Crop						
Cruiser *	87	0.9	7579	93	0.9	9274
Early Dawn	100	0.9	8268	100	0.5	5163
Emperor *	100	1.0	9196	100	0.9	8750
Galaxy	97	0.9	8460	97	0.9	8685
Green Belt *	93	1.1	10764	93	0.8	7292
Green Comet *	100	0.9	9196	90	0.9	7701
Green Valiant *	97	0.9	8760	100	0.9	8470
Packman *	97	1.0	9089	100	0.9	8770
Saga *	100	0.9	8809	100	0.9	9012
Symphony	97	0.7	6572	100	0.8	7260
Third Crop						
Early Dawn	97	0.8	7483	93	0.5	4195
Emperor *	97	0.7	6357	100	0.7	6727
Green Belt	83	0.9	6889	80	0.5	3686
Green Valiant *	100	0.8	7463	93	0.8	7049
Symphony	100	0.5	4961	97	0.4	4028

* Cultivars produced high quality heads at both Windsor and Mt. Carmel.

6,572-7260 lb/A. Yields of Galaxy and Early Dawn were below the national average and their heads were leafy.

In the third crop, yields of all cultivars declined compared to the first and second crops. The average yield of all cultivars at Windsor was 6,630 lb/A and 5,137 lb/A at Mt. Carmel, a difference of 29%. Although the yields of all cultivars at both sites did not exceed the national average, quality of Emperor and Green Valiant was excellent and consistent with 1987 trials (Hill 1988). The smaller heads were suitable for bunching.

Maturity.

In the first spring crop, maturity among the cultivars varied from 42 to 61 days at Windsor and from 40 to 61 days at Mt. Carmel (Table 7). The average maturity of all cultivars was 52 days at both sites. Among cultivars common to both first and second crops, average maturity in the second crop decreased to 48 days at both sites. Although the differences in maturity between the first and second crops were not large, they represented a trend of decreasing days to maturity with increasing temperature and long days in late-June and early-July, and were consistent with observations in 1987 (Hill 1988). A second crop, planted 2 weeks after the first, matured only 10 days after the first crop because of its faster maturity. Unlike cauliflower, the maturity of the first crop was not delayed by early frosts.

In the fall, the average maturity of all cultivars in the first crop was 56 days at Windsor and 60 days at Mt. Carmel. The increased days to maturity at Mt. Carmel, compared to Windsor, although not large, was due to downy mildew disease. In the second crop, maturity was 57 days at Windsor and 60 days at Mt. Carmel. Thus, with similar maturities in both crops at each site, the 2-week interval at planting was maintained through harvest. In the third crop, average maturity increased to 68 days at Windsor and 89 days at Mt. Carmel due to decreasing temperatures and day length. Despite delayed maturity, the mid-August planting of Emperor and Green Valiant at Windsor and Mt. Carmel provided harvest of quality heads until mid-November even with a heavy frost on October 30 with a temperature of 23F. The average increased days to maturity in the third crop may preclude its planting in the colder areas of Connecticut.

In both crops in the spring at Windsor and Mt. Carmel, the span of harvest mostly ranged 7-10 days. Galaxy and Early Dawn with spans of 12-14 days had poor quality. In the fall, harvest spans in the first crop varied between 1 and 12 days at both sites. In the second crop, most harvest spans were 7 to 10 days. In the third crop, harvest spans ranged from 4-25 days at Windsor and 9-29 days at Mt. Carmel. Emperor and Green Valiant, noted for their excellent quality, had highly variable harvest spans at both sites.

SUMMARY, 1985-1988

The broccoli and cauliflower trials were established to identify cultivars that are best suited to Connecticut's soil and climatic variations. Each cultivar was grown in spring and fall at Windsor and Mt. Carmel. Cultivars that yielded well and produced high quality heads in the first year were repeated and new cultivars were added to the trials. Cultivars that failed to meet national average yields (Anon. 1985) and quality standards (Anon. 1943) each year were usually dropped from testing. By elimination, I have identified several cultivars of both broccoli and cauliflower that withstood 3 or 4 years of variable heat, cold, drought, and wetness to produce high yields with heads of marketable quality. It should be noted that cultivars identified in this summary are reliable but not infallible due to weather extremes. In fact, cultivars dropped because of poor yield and/or quality the first year may have been treated too harshly, but it was impossible to test 48 cultivars of broccoli and 37 cultivars of cauliflower each year to determine their true probability of success. Some new cultivars tested late in the program may have had insufficient time to determine their long-term performance. Tables 8 and 9 list all cultivars of broccoli and cauliflower tested in 1985-1988. Details of their yield and quality may be found in Bulletins 830, 845, and 857 of this Station.

Tables 10 through 13 list only those cultivars that have produced good quality and yields above the national average at both sites for 1 year or more. I will now describe the characteristics and cultural requirements of the most reliable of these cultivars.

Broccoli

1. Premium Crop, a highly consistent cultivar tested in spring produced large, compact, flat heads weighing 0.8-1.1 lb. The average yield in 10 spring plantings was 8,339 lb/A with 6 of 10 plantings yielding above national average. It matures late (60 days) and can be planted April 20 to May 5 in the Connecticut Valley, but may be damaged by late frosts if planted before May 1 in cooler upland areas. Late maturing heads in the second spring crop have shown brown discoloration of individual flower buds (brown beading) and corky stems in less than 10% of the crop. Premium Crop was tested twice in fall. All crops developed bacterial soft rot in 1985 and brown beads in 1986.

2. Green Comet was a highly consistent spring cultivar that produced medium to large compact, flat to semi-domed heads weighing 0.5-1.1 lb. The average yield was 7,380 lb/A in 12 spring plantings . Despite yields somewhat below the national average, the quality of the heads was consistently good. Green Comet matures in 56-58 days and can be planted April 20 to May 5 in the

Table 7. Maturity of broccoli at Windsor and Mt. Carmel, spring and fall 1988

	Windsor				Mt. Carmel			
	Harvest Midpoint		Harvest Span		Harvest Midpoint		Harvest Span	
Cultivar	Spring Days*	Fall Days*	Spring Days**	Fall Days**	Spring Days*	Fall Days*	Spring Days**	Fall Days**
Cruiser	54	63	11	1	54	58	7	3
Early Dawn	42	43	2	11	40	46	7	12
Emperor	-	63	-	1	-	61	-	10
Galaxy	-	48	-	7	-	58	-	7
Green Belt	-	69	-	7	-	72	-	11
Green Comet	57	48	7	10	57	58	10	7
Green Valiant	-	65	-	6	-	68	-	4
Packman	-	48	-	12	-	58	-	7
Premium Crop	61	-	10	-	61	-	7	-
Saga	50	63	7	1	50	65	9	11
Southern Comet	-	63	-	1	-	58	-	3
Symphony	50	51	10	15	50	58	12	1
Second Crop								
Cruiser	50	53	7	10	50	58	10	7
Early Dawn	40	49	14	7	40	54	12	7
Emperor	-	60	-	7	-	61	-	7
Galaxy	40	53	14	4	33	54	12	7
Green Belt	54	67	7	7	61	72	10	14
Green Comet	50	53	7	7	50	54	7	10
Green Valiant	-	67	-	7	-	72	-	10
Packman	43	53	7	7	43	54	7	4
Premium Crop	54	-	7	-	54	-	7	-
Saga	50	60	7	3	50	65	7	4
Southern Comet	54	-	7	-	54	-	7	-
Symphony	47	53	3	7	47	58	7	7
Third Crop								
Early Dawn	-	48	-	7	-	78	-	10
Emperor	-	65	-	7	-	85	-	25
Green Belt	-	85	-	12	-	94	-	29
Green Valiant	-	85	-	25	-	94	-	9
Symphony	-	58	-	4	-	93	-	30

* Time from transplanting to midpoint of harvest.
** Time from start to finish of harvest.

Table 8. Broccoli cultivars evaluated 1985-88.

Cultivar	Years	Cultivar	Years
Atlantic	85	Green Duke	85-86
Baccus	85-86	Green Dwarf	85-86
Bonanza	85	Green Goliath	85
Bravo	85	Green Hornet	85
Calabrese	85	Green Sprouting	85
Citation	85	Green Valiant	86-88
Cleopatra	85	Kayak	87
Corvet	87	Laser	87
Cruiser	87-88	Mercedes	85-86
Dandy Early	85-87	Neptune	87
DeCicco	85	Oktal	87
Early Dawn	88	Orion	85-86
Early Emerald	86	Packman	86-88
Early One	85	Paragon	85-86
Embassy	87	Pirate	86-87
Emperor	86-88	Premium Crop	85-88
Excalibur	86	Prominence	85-86
Futura	85	Saga	88
Galaxy	85-88	Septal	87
Gem	85	Skiff	87
Grande	85	Southern Comet	85-88
Green Belt	87-88	Spartan Early	85
Green Comet	85-88	Symphony	85-88
Green Defender	87	Waltham 29	85

Table 9. Cauliflower cultivars evaluated 1986-88

Cultivar	Years	Cultivar	Years
Alert	86	Snowball Impr.	86
Andes	86-88	Snowball T3	86
Avalanche	88	Snowball Y Impr.	87
Candid Charm	87-88	Snow Crown	86-87
Cervina	87	Snow Flower	87
Cloud Nine	87-88	Snow King	86-88
Dominant	86	Snowman	88
Early Abundance	86	Snow Pak	86-88
Early White	87	Taipan	87-88
Imperial	87	White Castle	87
Linas	87	White Cloud	87
Montano	88	White Empress	86
Olympus	87	White Fox	87-88
Polar Express	86-88	White Knight	86-88
Raket	87	White Rock	87-88
Self-Blanche	87	White Sails	87-88
Silver Star	87	White Summer	87-88
Snowball	86	White Top	87-88
Snowball 741	87		

Connecticut Valley. No defects have been observed in spring crops. In the fall, Green Comet produced yields above the national average in only 1 of 3 years. About 25% of the plants in fall displayed yellowing of the heads and corky stems in each of 2 years. This leads me to conclude that its usefulness for fall harvest is limited.

3. Symphony, a newly released cultivar (tested as XPH5004), has shown consistent quality and yield for spring and fall plantings. The average yield in 10 spring plantings was 8,090 lb/A with five of 10 plantings yielding above the national average. The large, compact, domed heads weigh 0.8 to 1.2 lb and are somewhat exerted above the foliage for easy cutting and trimming. Its maturity is early to medium (49 days) and allows early planting April 20 to May 5. The early planting in one year was stunted by late April frost and yields were below 5,000 lb/A. No defects were observed in spring-grown heads. In fall, Symphony has produced satisfactory yields and quality in six of nine plantings with an average yield of 7,890 lb/A, slightly less than spring yields. Its maturity in fall is 53 days, and tests have shown that it can be planted July 15 to August 1. Late plantings up to August 15 have produced low yields with small leafy heads.

4. Packman has shown consistent quality and yield for spring and fall planting. In six spring plantings, the average yield was 8,540 lb/A with five of six plantings exceeding the national average. This early-maturing cultivar (46 days) produced large, compact, flat to semi-domed heads weighing 0.9-1.1 lb. Few defects were observed in spring crops. Packman is limited to spring plantings after May 1 in the Connecticut Valley and after May 10 in the colder upland areas. Buttoning was observed in 50% of the plants set in late April. Yields and quality were substantially reduced. In fall, Packman produced satisfactory yields and quality in 10 of 16 plantings. Yields in fall averaged 8,070 lb/A, slightly less than spring yields. In the fall 1988, bacterial soft rot was extensively observed in Packman in the first fall crop at both Windsor and Mt. Carmel but not in second crops at either site. Planting for fall harvest was best between July 15 and August 1. Plantings in mid-August developed small leafy heads.

5. Cruiser, tested for 2 years in spring, has produced consistently good yields and quality. In six spring plantings, the average yield was 8,435 lb/A with three crops exceeding the national average. The medium-maturing cultivar (54 days) produced large, compact, domed heads weighing 0.8 to 1.3 lb. The heads were well exerted for ease in cutting and trimming. Plantings from April 20 to May 5 in the Connecticut Valley showed few defects. In the fall, Cruiser's yield and quality were variable. In 1987, the first fall planting on July 15 produced excellent yields and quality at both sites. The first fall planting in 1988 produced very large lumpy heads

Table 10. Four-year summary--Spring Broccoli.

Year	1985	1986	1987		1988			
Crop * Cultivar	1	1	1	2	1	2	Avg Mat Days **	Avg Hvst Span Days **
Cruiser	-	-	X	-	X	X	54	11
Galaxy	0	X	0	X	-	0	46	14
Green Belt	-	-	-	-	-	X	57	8
Green Comet	X	X	X	X	X	X	56	10
Orion	X	0	-	-	-	-	48	27
Packman	-	X	-	X	-	X	46	12
Paragon	X	0	-	-	-	-	50	16
Premium Crop	-	X	X	X	X	X	59	13
Southern Comet	X	X	0	X	-	0	49	15
Symphony	X	X	X	X	0	X	49	9

X = Good quality and yield above national average (8,000 lb/A) at both sites.
0 = Poor quality and/or yield below national average at one or both sites.
- = Cultivar not grown in trial.
* Crop 1 planted April 20-24; Crop 2 planted May 4-8.
** Average for crops 1 and 2.

Table 11. Four-year summary--Fall broccoli.

Year	1985	1986			1987			1988				
Crop* Cultivar	1	1	2	3	1	2	3	1	2	3	Avg Mat. Days**	Avg Hvst Span Days **
Baccus	X	0	-	-	-	-	-	-	-	-	50	3
Cruiser	-	-	-	-	X	X	0	0	X	-	57	7
Emperor	-	X	X	0	X	X	X	X	X	X	63	9
Galaxy	0	X	-	-	0	0	0	0	0	-	54	9
Green Belt	-	-	-	-	X	X	X	0	X	0	68	7
Green Comet	0	0	-	-	-	-	-	X	X	0	58	18
Green Valiant	-	X	X	X	X	X	X	X	X	X	68	5
Packman	-	X	X	0	X	X	0	0	X	-	56	10
Paragon	0	X	-	-	-	-	-	-	-	-	54	8
Prominance	X	0	-	-	-	-	-	-	-	-	58	6
Southern Comet	0	X	-	-	0	-	-	0	-	-	57	10
Symphony	X	X	X	0	X	X	0	X	0	0	53	7

X = Good quality and yield above national average (8000 lb/A) at both sites.
0 = Poor quality and/or yield were below national average at one or both sites.
- = Cultivars not grown in trial.
* Crop 1 planted July 12-16; Crop 2 planted July 28-August 2; Crop 3 planted August 14-18.
** Average for crops 1 and 2; add 12 days for Emperor, Green Belt and Green Valiant, crop 3.

of poor quality. Plantings in early August produced excellent yield and quality in both years, but mid-August plantings developed small, leafy heads and low yield.

6. Emperor, a late-maturing cultivar (63 days), was highly consistent in fall plantings, producing large to very large compact domed heads weighing 0.9-1.2 lb. In 14 fall plantings the average yield was 7,980 lb/A, near the national average. Plantings about July 15 produced the highest yields, 9,000-11,000 lb/A. Yields declined to 6,000-7,000 lb/A in plantings made August 1 and August 15. The quality of the heads was excellent in all plantings despite lower yields. Smaller heads from late harvests can usually be bunched. Yield in one spring trial exceeded 13,000 lb/A, but the heads were very large and lumpy. Emperor was not tolerant of heat.

7. Green Valiant, a late maturing cultivar (68 days), was the most consistent of all fall cultivars, producing large, domed heads weighing 0.8-1.2 lb. The average yield in 18 fall plantings was 7,845 lb/A, near the national average. Plantings on July 15 and August 1 produced the heaviest yields (8,000 lb/A). The yields of plantings on August 15 declined to 7,000 lb/A. Tests showed that it was well adapted to cooler temperatures and can withstand modest frosts. Green Valiant, tested once in spring, produced heads that were very large and lumpy. It was not tolerant of heat. Heads, well protected by leaves, were somewhat difficult to cut and trim.

Cauliflower

1. Andes, in spring, was a consistent cultivar that produced medium to large, smooth, rounded curds weighing 1.7-2.3 lb. The average yield in six spring plantings was 17,300 lb/A with all plantings yielding well above the national average of 10,800 lb/A. Its mid-to-late maturity (68 days) restricts planting to late-April in the Connecticut Valley. Planting in May entails risk because the quality of the curd declined in July heat. In fall, the average yield was 15,310 lb/A. The quality of Andes was excellent in 2 of 3 years tested. In 1988, the curds in both fall crops were lumpy with small leaves protruding from the curd. Although maturity in fall increases to 83 days, Andes is suitable for planting July 15 to August 1 in the Connecticut Valley, but planting after July 20 in cooler upland areas may risk frost damage. Although known as a self-blanching type, tying of the curds in the spring crop and before October 1 in the fall crop assured blanching of the curd.

2. Polar Express, consistent in spring and fall, developed medium to large, smooth, well-rounded curds weighing 1.3 to 1.8 lb. In spring, the average yield was 13,985 lb/A in six plantings in 1986 and 1987. In 1988, the average yield in four plantings declined to 11,245 lb/A. Despite lower yields, the quality of the curds was consistently good. Its early maturity (61 days) allows planting in spring from April 20 to May 5. The later planting matured in early July in the Connecticut Valley. Planting in cooler upland areas before May 1 may be risky. In fall, the quality of Polar Express was consistently good, with an average yield in five crops of 13,940 lb/A. Maturity in fall increased to 79 days but still allowed plantings from July 15 to August 1 in the Connecticut Valley. Planting later than July 20 in the cooler upland areas with early frosts may be risky. The curds of Polar Express are unprotected by wrapper leaves. Tests showed that curds in spring and fall should be wrapped by the large leaves surrounding the curd.

3. White Knight, a consistent cultivar in spring and fall, produced medium to large, smooth, well rounded curds weighing 1.0-1.9 lb. The average yield in six spring plantings was 12,665 lb/A with four of six plantings yielding well above the national average. In 1988 yields were below the national average in three of four crops, but quality was excellent. Its early-to-mid maturity (60 days) allows planting in spring from April 20 to May 5 in the Connecticut Valley. Planting in cooler upland areas before May 1 may be risky. In fall, the quality of White Knight was consistently good with an average yield of 12,740 lb/A in 8 plantings . Maturity in fall increased to 79 days but allowed plantings from July 15 to August 1 in the Connecticut Valley. Planting after July 20 in cooler upland areas may be risky. Tying the leaves in spring and up to October 1 in fall produced well-blanched curds.

4. White Fox, a highly consistent cultivar in spring, produced medium to large, firm, rounded curds weighing 1.5 to 2.0 lb. The average yield in six spring plantings was 16,425 lb/A, well above the national average. Its mid-to-late maturity (69 days) and resistance to early July heat make it well-suited for plantings from April 20 to May 5 in the Connecticut Valley. Planting in cooler upland areas before May 1 may be risky. The curds in spring are borne high on the plant and are fairly well protected by wrapper leaves. Observations suggest, however, that curds maturing in early July should be wrapped to ensure blanching. White Fox planted in fall produced small to medium heads with average yields well below the national average.

5. White Rock, a consistent cultivar in spring, produced medium, firm, ball-shaped curds weighing 1.4-1.9 lb. The average yield in four spring plantings was 14,575 lb/A. Its late maturity (76 days) restricted planting to late-April in the Connecticut Valley and early May in cooler upland areas. The curds in spring are fairly well protected by wrapper leaves, but curds maturing in early-July should be tied to ensure blanching. Tested for 2 years in fall, White Rock produced curds of excellent quality and high yield in 1987, but in 1988 the plants were severely damaged by downy mildew both sites.

6. White Top, consistent in all spring plantings,

Table 12. Three-year summary--Spring cauliflower.

Year	1986	1987		1988			
Crop * Cultivar	1	1	2	1	2	Avg Mat Days **	Avg Hvst Span Days **
Andes	X	X	-	X	-	68	20
Avalanche	-	-	-	0	X	69	16
Candid Charm	-	X	-	0	0	68	15
Cloud Nine	-	X	-	0	0	68	12
Polar Express	X	X	X	0	0	61	11
Taipan	-	X	-	X	-	70	16
White Empress	X	-	-	-	-	61	21
White Fox	-	X	-	X	X	69	15
White Knight	X	X	X	0	0	60	18
White Rock	-	X	-	X	-	76	15
White Sails	-	X	-	X	0	68	15
White Summer	-	X	-	-	X	64	9
White Top	-	X	-	X	-	74	25

X = Good quality and yield above national average (10,800 lb/A) at both sites.
0 = Poor quality and/or yield below national average at one or both sites.
- = Cultivar not grown in trial.
* Crop 1 planted April 20-24; crop 2 planted May 4-8.
** Average for crops 1 and 2.

Table 13. Three-year summary--Fall cauliflower.

Year	1986	1987		1988				
Crop * Cultivar	1	1	2	1	2	3	Avg Mat Days **	Avg Hvst Span Days **
Andes	X	X	X	0	0	-	83	21
Candid Charm	-	X	-	X	X	-	84	13
Cloud Nine	-	X	-	0	0	-	84	26
Polar Express	X	X	X	X	X	-	79	12
Snow King	0	X	-	X	X	X	54	8
Snow Pac	0	X	-	0	0	-	105	17
White Knight	X	X	X	X	0	-	79	15
White Rock	-	X	-	0	0	-	97	25
White Sails	-	0	-	X	X	-	84	18
White Top	-	X	-	0	0	-	96	22

X = Good quality and yield above national average (10,800 lb/A) at both sites.
0 = Poor quality and/or yield below national average at one or both sites.
- = Cultivar not grown in trial.
* Crop 1 planted July 12-16; crop 2 planted July 28 - August 2; crop 3 planted August 14-18.
** Average for crops 1 and 2; add 4 days for Snow King in crop 3.

produced medium, firm curds borne high on the plant and weighing 1.2-1.6 lb. The average yield in four spring plantings was 12,975 lb/A. Its late maturity (74 days) restricted planting to late April in the Connecticut Valley and early May in cooler upland areas. White Top is self-blanching, but leaves surrounding the curds maturing in early July should be tied to ensure blanching. Tested for 2 years in fall, White Top produced high yield and quality in 1987, but in 1988, yield was greatly reduced because of damage by powdery mildew.

7. Taipan, consistent in all spring plantings, produced medium, firm curds weighing 1.5-1.7 lb. The average yield in four spring plantings was 15,245 lb/A. Its mid-to-late maturity (70 days) restricted planting to late April in the Connecticut Valley and early May in cooler upland areas. Although Taipan is self-blanching, trials have shown that leaves surrounding the curds maturing in early July should be tied to ensure blanching. In fall, yields were great but the curds were often lumpy with leaves protruding from the curd. In fall 1988, Taipan was severely damaged by downy mildew.

8. Candid Charm, consistent in all fall plantings, produced medium to large, firm curds weighing 1.5-2.1 lb. The average yield in six fall plantings was 15,180 lb/A, well above the national average. Its medium maturity in fall (84 days) limited planting to July 15 to August 1 in the Connecticut Valley. Plantings in the cooler upland areas after July 24 may be injured by frost. Candid Charm is self-blanching and requires no tying. In spring, yields were slightly above the national average, but quality of the curds was poor with lumpy uneven growth.

9. Snow King, consistent in all fall plantings, produced medium, firm, semi-domed curds weighing 1.3-1.6 lb. The average yield in fall plantings was 13,020 lb/A. Its very early maturity (54 days) allows successional planting from July 15 to August 15 in the Connecticut Valley but only to August 1 in colder upland areas. Yields of mid-August plantings averaged 8,315 lb/A with harvest in early-to-mid October. Plants maturing in September had to be tied to ensure blanching; tying was unnecessary for harvests in October. In spring, Snow King either buttoned prematurely or produced small heads weighing only 0.3 lb.

PLANTING STRATEGIES

I have demonstrated that broccoli and cauliflower can be successfully grown for harvest in June and in September through mid-November. Planting strategies can be developed to satisfy objectives for a series of single harvests to supply a supermarket chain every 2 weeks or multiple harvests to maintain a constant daily supply for retail at roadside stands.

For a single-harvest strategy within these harvest periods, selection of cultivars with short harvest spans is desirable. Broccoli cultivars Symphony, Cruiser, Green Belt, and Green Valiant and cauliflower cultivars Snow King, White Summer, and Polar Express have the shortest harvest spans with at least 90% of the crop maturing within 1 week. Planting at 2-week intervals from April 20 to May 5 and July 15 to August 15 would provide at least two harvests in spring and three harvests in fall. A danger in this strategy is that single cultivars may become infected by disease, especially in fall, and this may result in loss of the entire crop. Thus, it is important to use different cultivars for each planting.

For a constant supply of broccoli or cauliflower throughout the harvest periods two strategies are possible:

1. Cultivars can be chosen with different maturities so that harvests can be maintained over a broad span of maturity. In spring, for example, maturities of broccoli ranged from 46 days in Packman to 59 days in Premium Crop, a 13-day difference. In fall, maturities of broccoli ranged from 53 days in Packman to 68 days in Green Valiant and Green Belt, a 15-day difference. In spring, maturities of cauliflower ranged from 60 days in White Knight to 76 days in White Rock, a 16-day difference. In fall, maturities of cauliflower ranged from 54 days in Snow King to 97 days in White Rock, a 43-day difference. This unusually long maturity span is due to the very early maturity of Snow King. Cultivars providing the next earliest maturities are White Knight and Polar Express, 79 days, and would narrow the difference to 18 days.

To fill harvests throughout June and from September 1 to November 15, additional plantings would be necessary. I have successfully utilized two plantings in spring and three plantings in fall at 2-week intervals to fill the entire harvest period.

Planting several cultivars with different maturities would also minimize the danger of losing the entire crop to bacterial soft rot or downy mildew. My trials over several seasons have shown that the plants nearing maturity are the most susceptible to damage while others may have already been harvested or are only beginning to form heads.

2. Cultivars with broad harvest spans can be used for multiple pickings. For example, Green Comet, Packman, and Southern Comet had harvest spans of 10 to 15 days in spring and 10 to 18 days in fall. These single cultivars provided the same harvest span as two cultivars with early and late maturities. Cauliflower cultivars Andes, White Knight, White Rock, and White Top had harvest spans of over 21 days. Again, two plantings in spring and three in fall would encompass the entire harvest period, but with only one cultivar there would be greater risk of loss of a planting due to disease.

Thus, the grower may plant specific cultivars of known maturities and harvest spans at appropriate dates to achieve specific harvest objectives.

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